

**APPENDIX E**

***SPILL PREVENTION CONTROL AND  
COUNTERMEASURES PLAN***



## SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

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## SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

### 1. PREVENTATIVE MEASURES

The spill prevention and control methods listed in this section are based on approved spill control plans that the Company has used successfully in the past. This plan is comprehensive in that it addresses actions used to *prevent* spills in addition to specifying actions that will be taken should any spills occur, including emergency notification procedures. The Project's on-site EI(s) is responsible for ensuring that Contractors implement and maintain spill control measures. The responsibilities of these inspectors are described in the Federal Energy Regulatory Commission's ("FERC's") Erosion and Sediment Control Plan.

#### 1.1 TRAINING

The Contractor will instruct personnel on the operation and maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, and lubricants. Personnel will also be made aware of the pollution control laws, rules, and regulations applicable to their work.

Spill prevention briefings with the construction crew will be scheduled and conducted by the Contractor to insure adequate understanding of spill prevention measures. These briefings will highlight:

- precautionary measures to prevent spills;
- sources of spills, such as equipment failure or malfunction;
- standard operating procedures in case of a spill;
- equipment, materials, and supplies available for clean-up of a spill; and
- a list of known spill events.

*A spill is an un-permitted release of product, raw materials, or chemicals outside any secondary containment and into the environment. Spills can occur as a result of leaks, accidents, or third party incidents.*

#### 1.2 EQUIPMENT INSPECTION/MAINTENANCE

The Contractor will inspect and maintain equipment that must be fueled and/or lubricated according to a strict schedule. The Contractor will submit to the Company for approval written documentation of the methods used and work performed.

All containers, valves, pipelines, and hoses will be examined regularly to assess their general condition. The examination will identify any signs of deterioration that could cause a spill and signs of leaks, such as accumulated fluids. All leaks will be promptly corrected and/or repaired.

### 1.3 REFUELING

- (1) The Contractor will insure that equipment is refueled and lubricated within the ROW, compressor station yard, meter station site, or fee property and at least 100 feet away from all waterbodies and wetlands with the following exceptions:
- The EI finds, in advance, that no reasonable alternative is available and the Contractor and Company have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill;
  - Areas such as rugged terrain or steep slopes where movement of equipment to refueling stations would cause excessive disturbance to the ROW or workspace;
  - Areas where removing equipment from a wetland for servicing would increase adverse impacts to the wetland;
  - Sites where moving equipment to refueling stations from pre-fabricated equipment pads is impracticable or where there is a barrier from the waterbody/wetland (i.e., road or railroad);
  - Locations where the waterbody or wetland is located adjacent to a road crossing, compressor station yard, or meter station site (from which the equipment can be serviced); and
  - Refueling of immobile equipment including, but not limited to, bending and boring machines, air compressors, padding machines, and hydro-test fill pumps.

In these areas, auxiliary fuel tanks will be used to reduce the frequency of refueling operations and in no case will refueling take place within 100 feet of any known potable water wells.

- (2) The Contractor will assure that all refueling is done pursuant to the following conditions:
- Impact minimization measures and equipment will be sufficient to prevent discharged fluids from leaving the ROW, compressor station yard, meter station site, or workspace or reaching wetlands or waterbodies, and be readily available for use. These will include some combination of the following:
    - a. dikes, berms or retaining walls sufficiently impervious to contain spilled oil;
    - b. sorbent and barrier materials in quantities determined by the Contractor to be sufficient to capture the largest reasonably

- foreseeable spill;
  - c. drums or containers suitable for holding and transporting contaminated materials;
  - d. curbing;
  - e. culverts, gutters, or other drainage systems;
  - f. weirs, booms, or other barriers;
  - g. spill diversion or retention ponds; and
  - h. sumps and collection systems.
- All spills will be cleaned up immediately. Containment equipment will not be used for storing contaminated material.
- (3) The Contractor will prepare for approval by the Company a list of the type, quantity, and the storage location of containment and clean up equipment to be used during construction.

#### 1.4 STORAGE

Storage containment areas will not have drains, unless such drains lead to a containment area or vessel where the entire spill can be recovered.

#### 1.5 PERSONNEL SUPPORT

Prior to construction, the ROW inspector or agent shall identify and prepare a written inventory of water wells within 150 feet of the construction site. The Construction ROW Agent will notify the authorities of all potable water supply intakes located within three miles downstream of any crossings a minimum of one week prior to construction.

### 2. IMPACT MINIMIZATION MEASURES

Containment is the immediate priority in the case of a spill. A spill will be contained on the Company's property, ROW, compressor station yard, meter station site, or workspace, if possible. Clean up procedures will begin immediately after a spill is contained. In no case will containment equipment be used to store contaminated material.

Immediately report any spill or release of the following materials *regardless of location* (on-property or off-property) to the EI for notification to the appropriate Company representative as indicated below:

- Oil or petroleum products;
- Hazardous substances or hazardous wastes;
- Chemicals;

- Unplanned natural gas (flaring or venting); and,
- Asbestos-containing materials.

The following contacts are currently assigned to the Project and are subject to change (call in the order listed until someone is reached):

El Paso Corporation Field or Area Office (Location)

General Office Number:      Number  
Compliance Supervisor:      Kelley Beavers (205) 325-3784  
Field Env. Coordinator:      Name & Number  
Div. General Manager:      Name & Number

El Paso Corporation Houston Office (Houston, Texas)

General Dept. Number:      (713) 420-7340  
Environmental Coordinator:      Name & Number  
Department Manager:      Jon Barfield (713) 420-7902  
Department Director:      Tom Hutchins (713) 420-7918

If a spill enters a body of water, the Contractor will immediately take samples upstream and downstream from point of entry and refrigerate samples. If advised, additional analysis will be completed and/or additional samples will be gathered.

If the EI agrees and the Contractor determines that a spill is small enough such that the construction crew can safely handle it, the crew will use construction equipment to containerize all spilled material, contaminated soil, and sorbent material in a manner consistent with the spilled materials' characterization.

If the EI agrees and the Contractor determines that a spill can not be adequately excavated and disposed of by the construction crew alone, the Contractor will contact waste containment specialists. The Contractor will ensure that all excavated wastes are transported to a Company approved disposal facility licensed to accept such wastes. Wastes will not be transported to a company facility (i.e., Compressor Station, Meter Station Facility, etc.) unless the Field Environmental Coordinator approves it in writing.

The Contractor will prepare a Construction Site Spill Report form to be given to the Company that includes:

- a. the date, time and location of the occurrence or discovery of the occurrence;
- b. a description or identity of the material spilled;
- c. an estimate of the quantity spilled;
- d. the circumstances that caused the spill (e.g., equipment failure);

- e. a list of waterbodies affected or potentially affected by the spill;
- f. a statement verifying whether a sheen is present;
- g. the size of the affected area;
- h. an estimate of the depth that the material has reached in water or on soil;
- i. a determination of whether the spill will migrate off of the Company's property or the ROW or workspace;
- j. a determination of whether the spill is under control;
- k. a statement verifying that clean-up has begun and a description of the methods being used to clean up the spill;
- l. the names of the people observing the spill (with their affiliations) and the extent of injuries, if any;
- m. the Field "Report of Spill" form.

The Company shall ensure that the Contractor's spill report is complete and shall forward it to the Field Environmental Coordinator. The Contractor shall follow the "*Contractor's Environmental Guidelines - Waste Disposal and Spill Notification*" procedures regarding all required regulatory notifications, subject to Company's prior approval, and for obtaining any necessary state and local licenses, permits, or other authorizations associated with the project, except as otherwise provided in the scope of work. Contractor is responsible for knowing what state and local environmental authorizations are necessary for the specific job at hand. Any above-mentioned permits, clearances or authorizations obtained by Contractor shall be furnished to Company.

The following releases require immediate (within 1 hour of discovery) notification to the National Response Center ("NRC"):

- (1) Any petroleum product released into streams, rivers, lakes, or dry washes;
  - (2) A release that exceeds the reportable quantity ("RQ") of any CERCLA hazardous substances in any 24-hour period which is not fully contained;
  - (3) A release of a hazardous substance or hazardous waste which occurs during transportation; and,
  - (4) A release of hazardous waste which contains a RQ of a hazardous substance.
- The National Response Center (1-800-424-8802) will be notified immediately if spills occur above threshold levels (Clean Water Act, 40 CFR 110.10) into surface waters and/or wetlands.

### 3. SUGGESTED EQUIPMENT LIST

Section 1.3 of this plan states that the Contractor will prepare a list of the type, quantity, and location of storage or containment and clean up equipment to be used on the construction site. The list will include the procedures and impact minimization measures to be used in response to a spill. The Contractor's choice of impact minimization measures and equipment will be tailored to meet the characteristics of the affected terrain as well as the types and amounts of material that could potentially be spilled. The types of equipment that the Company expects to use to control spills at terrestrial sites and wetlands are described in the FERC's Erosion and Sediment Control Plan.

#### 3.1 TERRESTRIAL CONSTRUCTION

General equipment that the Contractor will use for spill containment and cleanup on terrestrial areas includes:

- sorbents (pillows, socks, and wipe sheets) for containment and pick up of spilled liquids;
- commercially available spill kits (or the functional equivalent thereof) that are prepackaged, self-contained spill kits containing a variety of sorbents for small to large spills;
- structures such as gutters, culverts, and dikes for immediate spill containment;
- shovels, backhoes, etc., for excavating contaminated materials;
- sumps and collection systems; and
- drums, barrels, and temporary storage bags to clean up and transport contaminated materials.

##### 3.1.1 Fuels and Lubricating Oil Storage

The Contractor will implement special measures to prevent spills in areas where trucks carrying fuel and where oil barrels are loaded. Containment equipment will be kept close to tanks and barrels to minimize spill response time, and will include absorbent pads or mats. The quantity and capabilities of the mats will be sufficient to capture the largest foreseeable spill, given ROW or workspace characteristics and crankcase and other fuel vessel capacities.

##### 3.1.2 Routine Refueling and Maintenance

Absorbent pads and mats will be placed on the ground beneath equipment before refueling and maintenance. Equipment that will be stored on site for routine refueling and maintenance includes small sorbent kits (or their functional equivalent).

**3.1.3 Equipment Failure**

Kits with the capacity of absorbing up to five gallons of liquid can fit beneath the operator's seat on construction equipment for use in an equipment failure.

**3.2 WATERBODY AND WETLAND CROSSINGS**

For each wetland and waterbody crossed, the equipment listed below will be available in addition to that needed for terrestrial construction. This equipment will be stored close to the water or wetland to minimize response time, and will include:

- oil containment booms and the related equipment needed for rapid deployment, and
- equipment to remove oils from water, such as oleophilic and hydrophobic absorbent booms and mats, and/or mechanical skimmers.

**APPENDIX F**  
**WASTE MANAGEMENT PLAN**



## WASTE MANAGEMENT PLAN

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## WASTE MANAGEMENT PLAN

The following information is to be used as a contractor's guidance tool when generating wastes on a project and to assist the contractor in developing a waste management plan, which must be submitted to the company before the project begins.

### 1. Waste Identification and Characterization

#### 1.1 Identifying Wastes

Wastes may be grouped into four categories, each requiring different forms of disposal: hazardous waste, non-hazardous waste, special waste, and universal waste.

- **Hazardous wastes** - Wastes that meet one of the criteria of ignitable, corrosive, reactive, toxic, or is specifically listed as hazardous waste by regulation. These wastes require special handling and disposal.
- **Non-hazardous wastes** - Wastes that do not fall into the other categories. This includes general trash.
- **Special wastes** - Wastes that do not meet the criteria for hazardous wastes, but may present special hazards or require special handling. Examples of special wastes are asbestos, polychlorinated biphenyls ("PCBs"), radioactive waste, and naturally occurring radioactive material ("NORM"). It's important to note that some states have their own classification of special wastes.
- **Universal wastes** - To reduce the amount of hazardous waste in municipal solid waste streams, the Environmental Protection Agency ("EPA") and many states recognize batteries, thermostats and lamps, e.g., fluorescent light bulbs, as "universal" and thus allow easier handling of these wastes.

#### 1.2 Waste Characterization

The Environmental Inspector ("EI") shall coordinate with the Field Environmental Representative and/or Compressor Station personnel to determine if existing waste profiles exist for wastes generated during construction. These locations maintain waste profiles that list the characterization results of various wastes. If the classification of a waste is unknown, the waste must be characterized using test results or knowledge of the process generating the waste to determine the proper handling requirements for that waste. The EI shall coordinate with the Field Environmental Representative and Contractor to determine the type of waste and the party responsible for proper disposal. The information below is used to characterize a waste.

- Source of the waste.
- Material Safety Data Sheets ("MSDS") for materials comprising the waste.

- Laboratory results from waste testing, as applicable.

Contact the Field Environmental Representative for waste characterization and sampling instructions if no existing waste profile exists.

Prior to waste characterization a number of general guidelines shall also be adhered to when handling or storing wastes.

- Ensure that the Contractor's Environmental Guidelines in the contract are followed.
- Ensure that the Contractor provides a list to the EI of all hazardous materials or potential contaminants that are to be used or stored on the project site.
- DO NOT bury any waste with the exception of stumps, rocks, or boulders as approved within the FERC's Plan and Procedures.
- Never mix any waste awaiting characterization with other wastes.
- Never ship any waste unless it has been characterized.
- Never ship any hazardous waste from the job site to a compressor station without prior approval from the Field Environmental Representative and compressor station.
- Ship wastes along with the required manifests only to company-approved facilities.
- Never ship drums of waste to a compressor station without prior approval from the Field Environmental Representative and the compressor station.

## 2. Waste Types

### 2.1 Hazardous Waste

Common wastes include, but are not limited to: pipeline sludge, spent pigs, sandblast abrasive (depending on type and use), paint thinner, and solvents.

The following procedures apply to storage of waste determined to be hazardous for all classes of generators:

- Store hazardous wastes using the Department of Transportation ("DOT") approved containers, a frac tank (bulk liquid wastes), a covered steel roll-off container with a poly-liner (bulk solid wastes like contaminated soil), or on a

thick poly-liner and provide the area with a poly-liner cover and temporary containment berm (bulk solid wastes).

- When using DOT-approved containers, be sure the containers are kept closed or sealed (except when waste is being added), maintained in good condition (not damaged, leaking or corroded) and store compatible substances that will not react with the hazardous waste. For example, store acidic wastes in plastic or plastic-lined containers rather than steel containers.
- Label hazardous waste containers (drums, tanks, roll-off containers) with a hazardous waste label as soon as any hazardous waste is placed into the container. Use a waterproof pen to complete the following information on the label:
  - o Generator name, address, and phone number.
  - o Generator EPA identification number.
  - o Description of waste (contact the Field Environmental Representative to obtain a waste description).
  - o The 4-digit EPA waste code (the Field Environmental Representative will provide EPA waste codes).
  - o Accumulation date (the date the waste was added to the container, if not from satellite storage, or the date it was brought to the waste storage area from a satellite accumulation area).
- Label waste piles with a weatherproof sign identifying the waste and the date the waste pile was started. Waste piles are to be placed on poly-liner, covered to protect them from weather, and surround with barricade tape.
- Store hazardous waste in a designated hazardous waste storage area (or in a designated satellite accumulation area) that is covered or protected from the weather; has an impermeable floor, surrounded by curbing or use spill pallets; and is more than 50 feet away from the facility property line if ignitable or reactive hazardous waste is stored in the area.

Manage the hazardous waste storage areas as follows:

- Identify as hazardous and non-hazardous waste appropriately.
- Arrange the containers by waste type, keeping similar hazardous wastes together.
- Separate any incompatible waste by a dike, berm, wall, or other containment device.
- Turn containers so labels may be read easily and ensure that enough isle space is left between drums to inspect for leaks and to gain access to respond to spills or fire.

- Handle waste containers carefully to prevent rupture or leaks, and protect containers from extreme temperatures.
- Large Quantity Generators and in some states Small Quantity Generators must have a contingency plan, make weekly inspections of hazardous wastes, and provide specific training to personnel.
- Hazardous waste can only be disposed at approved facilities. Contact the Field Environmental Representative for a list of approved facilities.

## **2.2 Non-Hazardous Waste**

Common wastes include, but are not limited to: oily rock/soil, oily rags, sandblast abrasive (depending on type and use), and general trash/garbage.

- Turn containers so labels may be read easily.
- Non-hazardous waste is waste that has not been found to be hazardous through testing or by generator knowledge but has special transportation and disposal requirements, which may include State permitting and approvals.
- Store non-hazardous wastes using one of the following methods:
  - In DOT-approved containers.
  - In a frac tank (bulk liquid wastes).
  - In a covered steel roll-off container with a poly-liner (e.g., bulk solid wastes like contaminated soil or used sandblasting abrasive).
  - On a thick poly-liner and provide the area with a poly-liner cover and temporary containment berm (bulk solid wastes).
- When using DOT-approved containers, be sure the containers are:
  - Kept closed or sealed (except when waste is being added).
  - In good condition (not damaged, leaking or corroded).
- Label non-hazardous waste containers (drums, tanks, roll-off containers) with a non-hazardous waste label identifying the contents as soon as waste is placed into the container.
- Store non-hazardous waste segregated from hazardous waste storage or satellite accumulation areas.
- Non-hazardous waste can only be disposed at approved facilities. Contact the Field Environmental Representative for a list of approved facilities.

Some States allow sandblast sand to be left in the ditch if sandblasting bare pipe only. Contact the Project Environmental Coordinator to verify if this type of activity may occur.

### **2.3 Special Waste (Asbestos & PCB)**

Common wastes include, but are not limited to: asbestos or asbestos containing material ("ACM") and PCBs.

#### ***2.3.1 Asbestos/ACM***

**Check with the Project Environmental Coordinator to determine if there are any additional state-specific requirements that may apply.**

- Store in double, six-mil thick plastic bags, or single bags in DOT approved drums.
- When placing asbestos into waste containers, do the following:
  - Make sure that the asbestos is thoroughly wet before closing the container for the final time.
  - Gloves and other solids can be added before sealing.
  - Seal all containers by securing the drum lids or by wrapping the neck of plastic bags with duct tape.
  - Store containers in an area where the waste is secure and not easily disturbed.
  - For accumulation containers, each item must be individually wrapped and placed in drum.
- Mark or label the container with the information indicated below:
  - The letters "RQ" for reportable quantity, if the waste contains one pound or more of friable asbestos.
  - The word "Waste".
  - The word "Asbestos" and the identification number for asbestos "NA2212".
  - The facility name and address.
  - A warning label stating "DANGER; CONTAINS ASBESTOS FIBERS; AVOID CREATING DUST; CANCER AND LUNG DISEASE HAZARD".
- Ship asbestos waste to a Company-approved disposal facility. Contact the Field Environmental Representative for a list of approved facilities.
- Pipe coated with non-friable asbestos can be sold and transported to a scrap dealer or individual buyer. Written notification to the dealer or buyer must include a disclosure and release document that indicates that the pipe is coated with an

asbestos-containing material. El Paso has a specific document for this purpose that contains the appropriate language. Contact the Field Environmental Representative for details on transferring pipe coated with non-friable asbestos.

- Do the following when preparing sections of pipe coated with friable asbestos-containing material for transportation to a Company-approved disposal facility:
  - Pipe joints must be less than 40 feet long for transportation by trailer (also verify whether or not a specific pipe length is required by the disposal company).
  - Pipe joints must be less than 20 feet long for transportation in a roll-off box.
  - Wrap ends of pipe with polyvinyl and duct tape or place in sealed roll-off container.
  - A manifest is required for transportation to a disposal facility.
  - Provide State environmental or health department registration, if applicable.
- Use either Company vehicles or contract vehicles that meet DOT requirements to transport asbestos waste. If the amount of asbestos-containing material being transported is 1,000 pounds or more, a commercial drivers license with hazardous materials endorsement is required.
- Ensure that the vehicle transporting regulated asbestos-containing material (friable) from the facility is marked with signs warning of asbestos danger while the vehicle is being loaded or unloaded. The sign should read "DANGER; ASBESTOS DUST HAZARD; CANCER AND LUNG DISEASE HAZARD; AUTHORIZED PERSONNEL ONLY".
- Inspect all containers before and after unloading/loading to ensure:
  - All drum tops are secured.
  - Duct tape has been placed around the necks of all bags and there are no punctures. Place additional bags over the outside of any punctured bags and secure the necks of the new bags with duct tape.
  - All containers are properly labeled.
- The type of shipping papers required depends on the State. A waste shipping record must be completed for each shipment. Check with the Project Environmental Coordinator to determine if there are any additional state-specific requirements that may apply.
- Make sure shipping papers are completed as follows:

- o Check the "RQ" column on the shipping paper or mark "RQ" before the shipping name if the shipment contains one pound or more of friable asbestos.
  - o DOT shipping name is "Waste Asbestos" or, if the asbestos waste is mixed with a binder, filler, or other material, "Waste Asbestos Mixture".
  - o Hazard Class Identification Number is "Class 9".
  - o North American Identification Number is "NA2212".
  - o Packing group is "PG III".
- Never dispose of asbestos-containing wastes by placing it in a container with other trash, by burying, using as fill material, or leaving in a pipe excavation ditch.
  - Dispose of asbestos-containing wastes as soon as practical at a disposal facility that is permitted to accept asbestos. Contact the Field Environmental Representative for a list of approved disposal sites for asbestos-containing wastes.

### 2.3.2 PCB Waste

In some states, PCB wastes are hazardous wastes and all hazardous waste requirements must be followed in addition to those listed in this procedure. **Check with the Project Environmental Coordinator to determine if there are any additional state-specific requirements that may apply.**

- PCB wastes may be stored for 30 days without any special storage requirements.
- PCB wastes may be stored up to one year within an EPA-defined storage area. Contact the Project Environmental Coordinator for assistance on setting up a PCB waste storage area.
- As a minimum, store liquid PCB wastes in DOT-approved containers or on pallets with containment designed to capture any drips or leaks.
- Protect storage containers or equipment from weather.
- Mark PCB wastes with the proper PCB label before being placed into storage. The basic PCB label is 6"x6", white or yellow, which can be reduced as small as 2"x2".
- Mark all PCB wastes with the date that the item was removed from service or the date that the waste was generated and enter this information on the PCB waste log. Mark the storage area with a sign.

- Company vehicles can only be used to transport PCB wastes from a Company location where the waste was generated to another Company location where the waste will be stored. Placards are required if transporting:
  - o More than 99.4 pounds of PCB waste in containers
  - o One or more PCB transformers with 500 ppm or more PCBs.
- Check containers before and after loading to make sure that they are in good condition, are not leaking, and that all covers are secured.
- A hazardous waste manifest must accompany each shipment of PCB waste.
- Contact the Project Environmental Coordinator for a list of Company approved PCB disposal facilities. Dispose all PCB wastes at an approved facility.
- Once the PCB waste has been shipped to an approved disposal facility, the owner or operator of the disposal facility shall send the manifest and acknowledgement of receipt to the generator identified on the manifest which accompanied the shipment of PCB waste within 30 days of the date the disposal facility received the waste. If an acknowledgement of receipt is not received with the manifest, the generator shall confirm by telephone by the close of business that the disposal facility received the manifested waste and document the acknowledgement in the PCB log. The disposal facility should also send a Certificate of Disposal within 30 days of actual disposal of the waste.

#### **2.4 Universal Waste**

Common wastes include, but are not limited to: batteries, thermostats, and fluorescent light bulbs.

- If any universal waste is generated during construction, contact the Field Environmental Representative for storage and disposal instructions.

**APPENDIX G**  
***STORMWATER MANAGEMENT REPORT***

STORMWATER MANAGEMENT REPORT

TENNESSEE GAS PIPELINE

COMPRESSOR STATION 270B1

PELHAM, NEW HAMPSHIRE

APRIL 2008



Prepared for:  
Tennessee Gas Pipeline, an El Paso Company  
1001 Louisiana Avenue  
Houston, Texas

Prepared By:  
SGC Engineering, LLC  
Westbrook, Maine

Project No. 628001



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# Stormwater Management Summary Tennessee Gas Pipeline – Compressor Station 270B1 Industrial Park Drive – Pelham, New Hampshire

## **Project Description**

Tennessee Gas Pipeline (an El Paso Company) is proposing a new liquid natural gas compressor station in Pelham, New Hampshire that will be accessed from Industrial Park Drive. This compressor station will be located immediately adjacent to a 50-foot wide easement containing two existing natural gas pipelines. These pipelines run in a north-south orientation through Pelham and its industrial park. The subject parcel is identified as Lot 5-111 on the Town of Pelham Assessor's Map 1. The 10.4-acre property is undeveloped and forested with access provided by an existing gravel drive from Industrial Park Drive that parallels the existing gas pipeline. A water main also occupies an easement adjacent to the pipeline. Beaver Brook forms the northerly property boundary and is also the townline between Pelham and Windham, New Hampshire. The parcel generally slopes to the north Beaver Brook and its bordering wetlands at an average of 8-12%.

The project's primary physical components are a control building, the compressor building, and the blower facilities. The existing gravel access will be upgraded to a paved access road and additional pavement will be provided for parking. In total, the project consists of approximately 45,600 sq-ft of new impervious coverage. Approximately 34,000 sq-ft is attributed to roads and parking with the remaining impervious surface associated with the actual compressor station facilities. Municipal water is to be provided from the water main that runs through the property. A small subsurface wastewater disposal system has been designed and included in the project plans.

## **Soil Conditions**

We have used Hillsborough County USDA Soil Conservation Service mapping as the basis for the hydrologic group classification of the on-site soils. The upland portion of the site is predominated by Hinckley and Windsor Loamy Sands (HSG A). A strip of Pootatuck Fine Sandy Loam (HSG B) is adjacent to Beaver Brook and its bordering wetlands. Numerous test pits have been conducted on site as part of the geotechnical evaluation for the project and have confirmed the sandy nature of the soils. Soil limits are provided on the watershed plans W.S.1 and W.S.2.

## **Stormwater Modeling**

SGC Engineering, LLC has utilized HydroCad® Version 8.5 Stormwater Modeling Software for modeling the site in both its pre- and post-development conditions in order to compare the peak rates of runoff for 2-year and 10-year, 24-hour storm events. The peak rates are summarized



below in Table 1. HydroCad output for each storm event is attached to document the modeling methodology.

### **Existing Drainage Conditions**

The parcel has two distinct drainage sheds shown on the attached sheet W.S.1. The northerly portion of the site drains from the natural high point toward Beaver Brook. This watershed is modeled as Watershed 1S and is comprised of approximately 10.4 acres of undeveloped land. Watershed 1S comprises the entire project site with the exception of a portion of the entrance road. Runoff from this watershed is modeled in the attached Hydrocad output as discharging to Point of Analysis (POA) #1. The entrance road drains in the southerly direction away from the high point back toward Industrial Park Drive. This watershed is modeled as Watershed 2S and is approximately 1.75 acres in size. Runoff from the site to Industrial Park Drive is modeled as discharging to POA #2. The calculated runoff rates for the undeveloped parcel are very low as should be expected based on the well-drained on-site soils. Beaver Brook is approximately 30-40'-wide and 3-4'-deep as it meanders from west to east in the vicinity of the project site. The runoff analysis for the parcel in its undeveloped state suggests that this watershed has very little influence on the flow characteristics of Beaver Brook.

The predicted runoff rates for both of the drainage areas are summarized below in Table 1.

### **Proposed Drainage Conditions**

As noted above, the project will create approximately 45,600 sq-ft of new impervious coverage associated with access road construction and site development. Inherently, this will create an increase in stormwater runoff if some form of stormwater infiltration/detention is not provided. Stormwater detention is provided utilizing two small, 4'-deep (3' effective depth) stormwater impoundments. It is also assumed, though not accounted for in the model, a significant amount of infiltration will occur in the newly constructed swales and stormwater depressions.

We have modeled the same two Points of Analysis for the proposed stormwater conditions as were modeled for the existing conditions to illustrate that runoff rates generated by the property after the development is completed will be in acceptable ranges when compared to existing runoff rates. A comparison of pre-development vs. post-development flows is summarized in Table 1 below.

Point of Analysis #1 (Beaver Brook) remains the major discharge location for the property. For the post-development model Watershed 1S1 has been 'sub-divided' into three smaller watersheds (1S1-1S3) to more accurately model the runoff conditions of the proposed site development. Watershed 1S1 comprises the most southerly portion of the developed area. This watershed drains to the stormwater impoundment modeled as Pond 1P1 which is located adjacent to the proposed controls building. Runoff from this watershed is less than 1 cfs during the 10-year event and is reduced to 0.13 cfs once modeled in conjunction with 1P1. A 10'-wide stone overflow has been provided to function as a level spreader should 1P1 overtop during a more



significant rainfall event. The land area down-gradient of this overflow will be maintained as a forested buffer to provide stormwater treatment.

Watershed 1S2 represents the majority of the developed portion of the facility. This watershed will be drained via the use of several grassed drainage swales with stone check dams. Ultimately the watershed drains to a stormwater impoundment modeled as Pond 1P2 situated behind the blower assembly. The impoundment will have a three foot effective depth similar to Pond 1P1 but the outflow rates will be mitigated by implementing an orifice controlled outlet structure. This structure is detailed on Sheet 3.2. Pond 1P2 also utilizes a 10'-wide stone overflow for larger storm events. The collected runoff from each of these outlets is routed to a plunge pool/level spreader to return the runoff to sheet flow prior to discharge to a maintained forested buffer.

Post-development Watershed 1S3 represents the remaining undeveloped portion of the site that is tributary to Beaver Brook/POA #1. Runoff in this watershed will not be altered by the proposed site plan.

Similar to the existing condition, Watershed 2S will be tributary to Industrial Park Drive/POA#2. This watershed is essentially unaltered from its existing condition. The proposed plan includes upgrading the entrance road from gravel to pavement and grading some stabilized roadside ditches with check dams. The result will be better drainage, less erosion and improved stormwater treatment.

We have evaluated runoff at the same points of analysis used to model existing runoff. Stormwater is proposed to be managed so that post-development runoff rates will not be substantially different from those experienced under pre-development conditions. The following summary of runoff rates demonstrate that the proposed stormwater management practices will be successful in mitigating the effects of the impervious surfaces proposed to be constructed within this development:

**Table 1 - Stormwater Discharge Summary**

Location	Event	Runoff Rate, cfs	
		Existing	Proposed
POA #1: Beaver Brook	2-Year	2.9	0.24
	10-Year	4.3	4.42
POA #2: Industrial Park Drive	2-Year	2.9	0.10
	10-Year	4.3	1.21
<b><u>Net Off-Property Runoff</u></b>	2-Year	<b><u>0.34</u></b>	<b><u>0.61</u></b>
	10-Year	<b><u>5.63</u></b>	<b><u>5.24</u></b>

As reported, the runoff from the site to Beaver Brook will experience a slight increase as modeled during the 2-year event. Given that Beaver Brook is approximately 30-40'-wide and 3-4'-deep in the vicinity of the project site, the projected increase of approximately 0.35 cfs will not alter the capacity of the brook or adversely affect down-gradient drainage facilities.



### **Stormwater Quality**

Vegetated filter strips/buffers will be preserved to provide adequate stormwater treatment consistent with the requirements of the New Hampshire DES Site Specific Application. Each of the two stormwater impoundments will outlet to a preserved forested buffer outside of the compressor station fence line that will function as a natural filter of stormwater prior to its discharge to Beaver Brook. The projected flow rate for the 10-year storm entering into the buffer from 1P2 has a maximum value of 0.4 cfs. The well-drained soils and micro-topography within the buffer areas will further attenuate flow rates and encourage sediment removal prior to discharging into Beaver Brook.

To treat the stormwater runoff from Watershed 2S, stone check dams have been added to the roadside swale to encourage filtering and infiltration of runoff discharged from the road surface.

